GFSRS LEARNING

Food Safety Laboratory Capacity Building

Module 2 Quiz – Answer Key

1. Your colleague does not understand the difference between polyclonal and monoclonal antibodies. Explain in your own words.

Polyclonal: antibodies secreted by different B cell lineages.

Monoclonal: antibodies secreted by one B cell. They are clones and target the same epitope.

2. Your colleague does not understand why cross reactivity are more likely to occur with polyclonal antibodies. Explain with your own words.

Polyclonal antibodies target different epitopes of one molecule. The probability to find one of these epitopes in other molecules is higher when several epitopes are involved in a reaction.

3. Your colleague does not understand the difference between direct and indirect ELISA. Explain with your own words.

Direct ELISA: the antibody that interact with the antigen is also the antibody linked to an enzyme and will be used for detection.

Indirect ELISA: the antibody that interact with the antigen is not linked to an enzyme and a second antibody needs to be used for the production of the signal.

4. Explain to your colleague why indirect and direct ELISA kits are not commercially available.

It is not possible to prepare the plates in advance because the tested sample must be coated in the plate.

5. You are using an ELISA test to quantify mycotoxins in bread. The bread ingredients are wheat flour, granulated sugar, dry yeast, salt and canola oil. What should you do? And why?

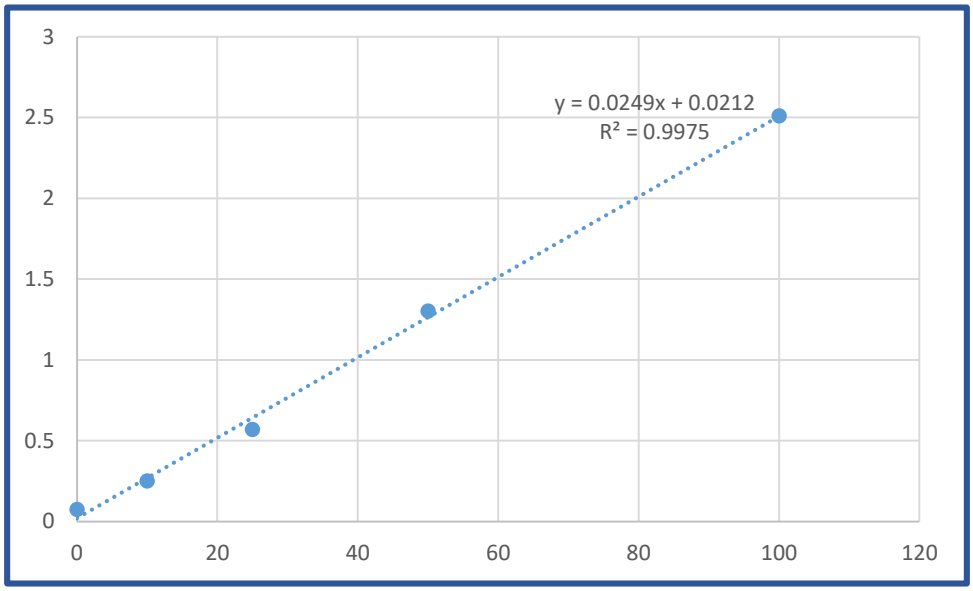
Test the different ingredient individually, to confirm the absence of cross reactivity with the ELISA test.

Validate the absence of interferents.

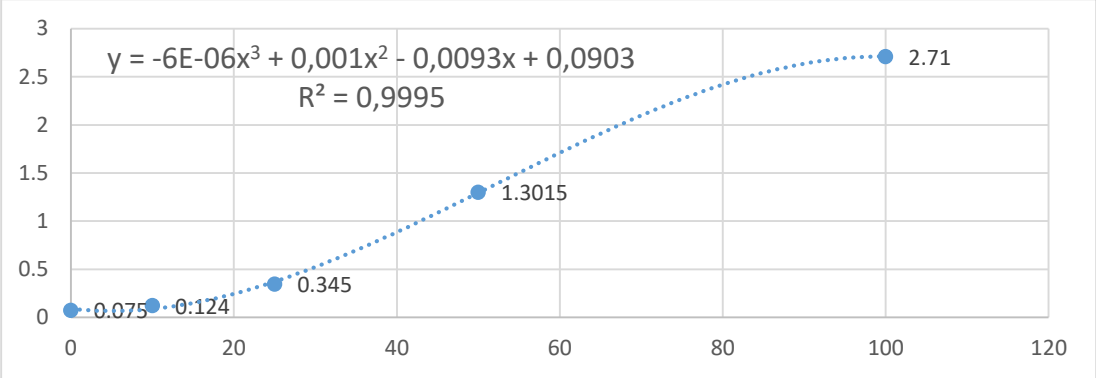
6. You are doing an ELISA test. In this ELISA kits, there are 5 different standards (0, 10, 25, 50, 100 µg/L of analyte X). Each standard was tested in duplicate (as it should always be). The optical density measures are the following:

	Duplicate 1	Duplicate 2
0 ppm	0.072	0.078
10 ppm	0.254	0.246
25 ppm	0.543	0.598
50 ppm	1.345	1.258
100 ppm	2.567	2.453

The kit instruction indicates to use a linear regression curve. Determinate the equation of the standard curve and discuss the R^2 number.



7. You are performing an ELISA test. The test indicates to use a cubic spline to create the standard curve equation. Your experiment went well, and you obtain the following standard curve:



You tested five different samples and you obtain the following optical density measures.

Calculate the concentration of the targeted analyte in the five samples if possible.

If it is not possible, explain why, and what should be your next step.

Sample 1 OD: 1

- approximately 42 concentration units

Sample 2 OD: 2

- between 63 and 64 concentration units

Sample 3 OD: 3

- outside the standard curve, dilute and retest

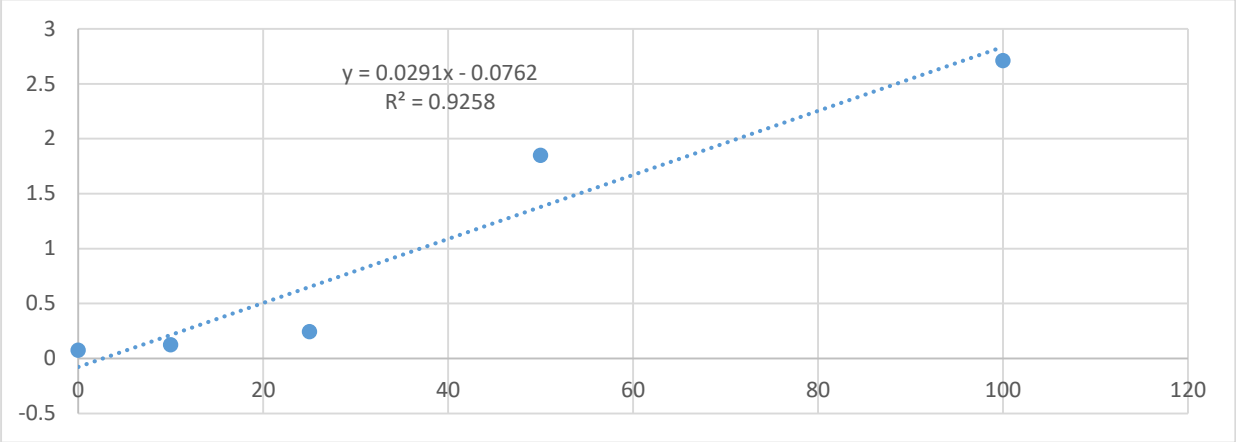
Sample 4 OD: 0,053

- negative sample

Sample 5 OD: 0,345

- 25 concentration units

8. During one of your ELISA tests, you obtained the following standard curve.



The manufacturer of the kit indicates to use a linear regression curve to obtain the standard curve. After a discussion with your colleague, you decided to not discard the results obtained with this test. Explain why.

Your standard curve is not good enough. The R2 number is below standard.

9. Your colleague used a competitive ELISA test. He was disappointed by the fact that is negative control presents coloration. Explain why this is completely normal with a competitive ELISA test.

In competitive ELISA, an inverse relationship between antigen concentration and substrate turnover is produced. So a negative control should present a strong coloration.

10. You want to detect DDT (a pesticide) in a cereal bar with chocolate with an ELISA test. While testing the chocolate alone (see question 5 if you ask why) with **a sandwich ELISA test**, you realize that the ELISA test gives you a positive result. What could be the explanation?

Cross reactivity.

The chocolate matrix is contaminated with DDT.